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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/622,046	07/16/2003	Shenggao Liu	005950-833	2268

7590 12/05/2005
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EXAMINER
NADAV, ORI

ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 12/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/622,046	Applicant(s) LIU ET AL	
	Examiner Ori Nadav	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 and 39-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-34 and 39-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/9/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-3 and 12-14 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 13 and 19 of copending Application No. 10/622,130. Although the conflicting claims are not identical, they are not patentably distinct from each other because both inventions recite an n-type and a p-type diamondoid materials comprising heteroatoms of various elements.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 23-34 and 39-42 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 13

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and 19 of copending Application No. 10/622,130 in view of Davis (Diamond films and coatings, Chapter 8, 1993, Noyes Publications, Park Ridge, NJ, USA). Claims 13 and 19 of copending Application No. 10/622,130 teach substantially the entire claimed structure, as recited in claims 23-34 and 39-42, except using the n-type and the p-type diamondoid materials in practical applications such as transistors and diodes. Davis teaches in section 6.0, second paragraph, using the n-type and the p-type diamondoid materials in practical applications such as transistors and diodes. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the n-type and the p-type diamondoid materials in transistors and diodes, in copending Application No. 10/622,130, in order to use the invention in a practical application.

Claims 1-34 and 39-42 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 6-8 of copending Application No. 10/621,956 in view of Davis (Diamond films and coatings, Chapter 8, 1993, Noyes Publications, Park Ridge, NJ, USA). Claims 1 and 6-8 of copending Application No. 10/621,956 teach substantially the entire claimed structure, as recited in claims 1-34 and 39-42, except using an n-type phosphorus and a p-type boron diamondoid materials in practical applications such as transistors and diodes. Davis teaches in section 6.0, second paragraph, using an n-type and a p-type diamondoid materials in practical applications such as transistors and diodes. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an n-type phosphorus and a p-type boron diamondoid materials in

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transistors and diodes, in copending Application No. 10/621,956, in order to use the invention in a practical application.

This is a provisional obviousness-type double patenting rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7, 12-18, 23-34 and 39-42 are rejected under 35 U.S.C. 102(b) as being anticipated by Davis (Diamond films and coatings, Chapter 8, 1993, Noyes Publications, Park Ridge, NJ, USA).

Regarding claims 1-7, 12-18 and 23-34, Davis teaches in pages 384 and 395-402 an electrical p-n junction and a diamondoid transistor comprising a p-type and an n-type diamondoid materials, wherein the n-type diamondoid material comprising an electron-donating heteroatom, wherein the electron-donating heteroatom is a group V element, and is selected from the group consisting of nitrogen, phosphorus, and arsenic, wherein the material comprises an aza-diamondoid, wherein the electron-donating heteroatom occupies a substitutional site on the diamond lattice, and is sp³ hybridized in the diamond lattice, and wherein the diamondoid is selected from the group consisting of adamantane, diamantane, and triamantane, and a p-type diamondoid material

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comprising an electron-withdrawing heteroatom from a group III element consisting of boron and aluminum, and wherein the material comprises an boro-diamondoid.

Regarding the claimed limitation of "diamondoid", a diamondoid compound is part of the diamond lattice. Applicant also defines heterodiamondoid as a diamondoid that contains a heteroatom positioned on a lattice site of the diamond crystal (page 16, lines 1-3). Since Davis teaches a heteroatom positioned on a lattice site of the diamond crystal, then the term "diamondoid" is inherent in Davis's structure.

Regarding claims 39-42, Davis teaches in pages 384 and 395-402 a diamondoid transistor comprising a substantially single material, the transistor comprising electrically conducting regions and electrically insulating regions, wherein:

the electrically conducting regions of the transistor comprise n and p-type heterodiamondoid materials; and

the electrically insulating regions of the transistor comprise undoped diamondoid materials (page 396),

wherein the n-type diamondoid material comprises aza-heterodiamondoid, wherein the n-type diamondoid material comprises phospho-heterodiamondoid, and wherein the p-type diamondoid material comprises boro-heterodiamondoid.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9-11 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davis in view of Chapman (5,053,434).

Regarding claim 9, Davis teaches substantially the entire claimed structure, as applied to claims 1 and 12 above, except the n-type diamondoid material is a polymerized heterodiamondoid. Chapman teaches an n-type diamondoid material being a polymerized heterodiamondoid.

It would have been obvious to a person of ordinary skill in the art at the time the invention was use an n-type diamondoid material being a polymerized heterodiamondoid in Davis's device in order to improve the device characteristics. Note that substitution of materials is not patentable even when the substitution is new and useful. *Safetran Systems Corp. v. Federal Sign & Signal Corp.* (DC NIII, 1981) 215 USPQ 979.

Regarding claims 10 and 21, prior art teaches a polymerized heterodiamondoid material further including a metal atom to enhance electrical conductivity.

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Regarding claims 11 and 22, prior art does not teach a metal being gold. It would have been obvious to a person of ordinary skill in the art at the time the invention was use a metal being gold in Davis's device in order to improve the device characteristics.

Claims 8 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davis in view of Ashjian et al. (5,400,427).

Davis teaches substantially the entire claimed structure, as applied to claims 1 and 12 above, except a diamondoid is selected from the group consisting of tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane, decamantane, and undecamantane. Ashjian et al. teach a diamondoid is selected from the group consisting of tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane, decamantane, and undecamantane.

It would have been obvious to a person of ordinary skill in the art at the time the invention was use a diamondoid is selected from the group consisting of tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane, decamantane, and undecamantane in Davis's device in order to improve the device characteristics. Note that substitution of materials is not patentable even when the substitution is new and useful. *Safetran Systems Corp. v. Federal Sign & Signal Corp.* (DC NIII, 1981) 215 USPQ 979.

Response to Arguments

Applicant argues that that the double patenting rejection should be withdrawn, because claims 1-21 of the '130 application do not recite either "n-type" or "p-type" diamondoid materials.

Claims 1-21 of the '130 application recite "n-type" and "p-type" diamondoid materials. More specifically, claims 13 and 19 recite phosphorus and boron, which are "n-type" and "p-type" materials, respectively.

Applicant argues that that the double patenting rejection should be withdrawn, because claims 1 and 6-8 of the '956 application do not recite either "n-type" or "p-type" diamondoid materials in a diamondoid transistor.

The examiner agrees that claims 1 and 6-8 of the '956 application do not recite either "n-type" or "p-type" diamondoid materials in a diamondoid transistor. However, Davis teaches in section 6.0, second paragraph, using an n-type and a p-type diamondoid materials in practical applications such as transistors and diodes.

Applicant argues that Davis diamond film and not diamondoid materials.

Diamondoid compound is part of the diamond lattice. Applicant also defines heterodiamondoid as a diamondoid that contains a heteroatom positioned on a lattice site of the diamond crystal (page 16, lines 1-3). Since Davis teaches a heteroatom positioned on a lattice site of the diamond crystal, then the term "diamondoid" is inherent in Davis's structure.

Applicant argues that an artisan would not be motivated to combine Davis and Chapman, because the adamantane polymeric compositions of Chapman are materials quite distinct from diamond films and coatings as disclosed in Davis.

Davis teaches an n-type diamondoid material. Chapman teaches an n-type diamondoid material being a polymerized heterodiamondoid. Therefore, an artisan would be motivated to form the n-type diamondoid material of Davis from a polymerized heterodiamondoid, as taught by Chapman. Note that substitution of materials is not patentable even when the substitution is new and useful. *Safetran Systems Corp. v. Federal Sign & Signal Corp.* (DC NIII, 1981) 215 USPQ 979.

Applicant argues that an artisan would not be motivated to combine Davis and Ashjian et al., because the material of Ashjian et al. is quite distinct from the diamond films and coatings as disclosed in Davis.

Davis teaches an n-type diamondoid material. Ashjian et al. teach a diamondoid selected from the group consisting of tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane, decamantane, and undecamantane. Therefore, an artisan would be motivated to form the diamondoid material of Davis from the group of materials, as taught by Ashjian et al. Note that substitution of materials is not patentable even when the substitution is new and useful. *Safetran Systems Corp. v. Federal Sign & Signal Corp.* (DC NIII, 1981) 215 USPQ 979.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ori Nadav whose telephone number is 571-272-1660. The examiner can normally be reached between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Loke can be reached on 571-272-1657. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Ori Nadav', is positioned above the printed name.

O.N.
12/1/05

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TECHNOLOGY CENTER 2800